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CONSTRUCTION OF THE MECHANICAL AND ELECTRICAL INFORMATION TEST --ETC(U)
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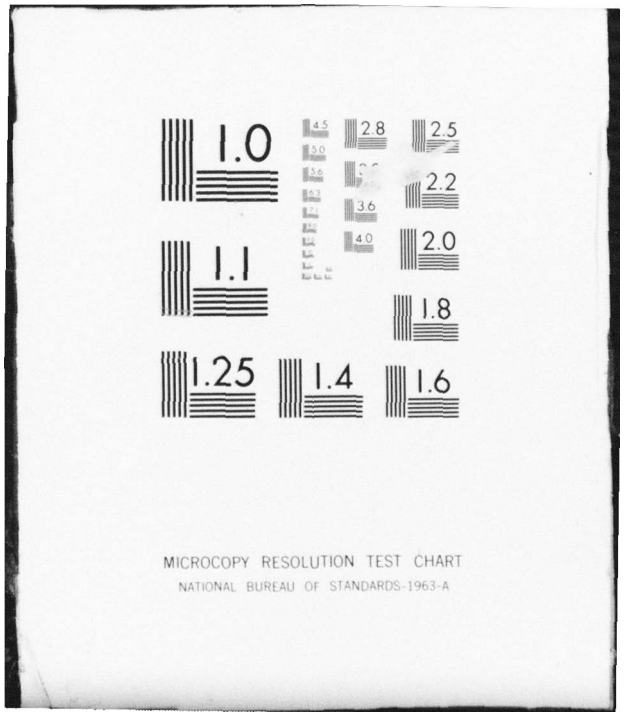
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RESEARCH MEMORANDUM 61-1

CONSTRUCTION OF THE MECHANICAL AND ELECTRICAL INFORMATION TEST FOR WOMEN

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HUMAN FACTORS RESEARCH BRANCH

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(9) Research Memorandum 61-1

(6) CONSTRUCTION OF THE MECHANICAL AND ELECTRICAL INFORMATION TEST FOR WOMEN

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CONSTRUCTION OF THE MECHANICAL AND ELECTRICAL INFORMATION TEST FOR WOMEN

PURPOSE

Information on the level of performance to be expected of women in specified job areas is essential to effective Army planning for maximal utilization of enlisted women in the event of mobilization. Through a series of research studies, jobs in the electronics and electrical maintenance areas were selected for intensive study of the performance potential of enlisted women.

The first step in the planned research study is to select from enlisted women volunteers for training in these areas those who are likely to complete the technical training successfully. For the initial study, women will be selected on the basis of their scores on the Electronic Aptitude Area (EL), the currently operational composite for EM. However, the Mechanical Aptitude Test (MA) and the Electronics Information Test (ELI), which comprise the EL composite, were developed on a male sample and may not be appropriate for women. The American culture has different expectations from women than from men and provides women with only limited exposure to such activities as the handling of mechanical and electrical equipment. In fact, the operational MA and ELI tests have been assessed for enlisted women and found to be too difficult to yield effective discrimination. The present Research Memorandum describes the construction of the Mechanical and Electrical Information Test for Women (MEIT-W-1XR), which is intended to meet the need for an instrument more appropriate for use with women.

PROCEDURE

Effort was made to select or prepare items for the new test which would require mechanical and electrical information about which women could have gained knowledge in our culture. All pictorial items included in the new test were selected from the Mechanical Aptitude Test (Forms 5B and 6B) and from the Electronics Information Test (1B and 2B) on the basis of item statistics resulting from administration of the two tests to two samples of WAC trainees during the spring of 1960. For MA the sample totaled 315 (N = 168 for MA-5B; 147 for MA-6B). For ELI the sample totaled 625 (N = 304 for ELI-1B, 321 for ELI-2B). The samples were considered reasonably representative of EW input on whom classification test scores in the mechanical-electrical domain would be needed.

Pictorial items were considered for inclusion in the new instrument provided the p value for the keyed response reached the minimum standard (.60 or higher for two-choice items, .50 or higher for three-choice items, .40 or higher for four-choice items). Since the new test was to consist entirely of four-choice items, only those two- or three-choice picture

items which could be made into reasonable four-choice items could be included. Alteration of items was limited to the MA since all the items of the ELI were already four-choice. In the end, from the MA, 5 three-choice and 19 two-choice items were altered to four-choice items. One four-choice item was used unchanged.

An additional pool for items, all verbal, was constructed and assembled in booklet form (MEIT-W, PT 3929) for preliminary tryout. All items were four-choice and asked for information which, it was hypothesized, women in our culture have the opportunity to acquire, provided they have the interest. Most of the items were original and were based upon the background knowledge and information of the test constructor. A few items were taken outright from HFRB files of Army tests used during World War II. The MEIT-W was the source for all verbal items included in the New Mechanical and Electrical Information Test for Women, with the exception of one item selected from ELI-2B.

The MEIT-W was administered to 350 WAC basic trainees at Ft. McClellan in April 1960. P value, r_{it}, and r_{ic} were computed for the keyed response to each item. For r_{it} computation, total score (R - 1/3W) for Part I (Mechanical Information) and total score (R - 1/3W) for Part II (Electrical Information) served as the criterion for items in their respective parts. For purposes of computing r_{ic}, MA score served as the criterion for items in Part I (Mechanical Information) and ELI as the criterion for items in Part II (Electrical Information). MA (5B or 6B) and ELI (1B or 2B) scores were available for each of these 350 trainees. The selection of verbal items for the new test was based on p value (minimum of .40), and magnitude of r_{ic} and r_{it}. For the selection of the one item from ELI-2B, only p value was available.

CONTENT OF EXPERIMENTAL TEST, MECHANICAL AND ELECTRICAL INFORMATION TEST FOR WOMEN (MEIT-W-1XR, PT 4007)

Selection of items for the new test is summarized below. Statistical data for individual items are listed in the Appendix, with the exception of data on the 25 pictorial mechanical information items adapted from the MA test of the ACB. Inasmuch as 24 of the 25 original items from the MA test were altered, obtained item statistics are no longer relevant for this set of items.

CONTENT OF MEIT-W-1XR (PT 4007)

Part	Number of Items	Item Type	Source	Item Statistics (Mean Values)
PART I				
Mechanical Information (items 1-40)	25	pictorial	MA-5B (12 items) MA-6B (13 items)	p value for original 2-, 3-, and 4-choice items was .74
	15	verbal	MEIT-W	p value .67 r_{ic} .24 r_{it} .48
PART II				
Electrical Information (items 41-75)	15	pictorial	ELI-1B (4 items) ELI-2B (6 items) Common to 1B-2B (5 items)	p value .63
	19	verbal	MEIT-W	p value .62 r_{ic} .26 r_{it} .46
	1	verbal	ELI-2B	p value .67

APPENDIX A-1

STATISTICAL DATA FOR VERBAL MECHANICAL INFORMATION ITEMS
IN MEIT-W-1XR
(N = 350 WAC Basic Trainees)

MEIT-W-1XR Item Number	Source MEIT-W Item Number	p value	r_{ic}	r_{it}
26	47	.96	.29	.36
27	32	.81	.32	.51
28	25	.67	.22	.46
29	8	.52	.21	.53
30	42	.69	.22	.37
31	2	.49	.18	.42
32	40	.86	.29	.58
33	44	.49	.22	.46
34	14	.74	.20	.40
35	19	.66	.32	.63
36	28	.44	.25	.38
37	31	.63	.17	.53
38	15	.80	.23	.48
39	35	.82	.20	.47
40	17	.47	.24	.55

APPENDIX A-2

STATISTICAL DATA FOR PICTORIAL ELECTRICAL INFORMATION ITEMS IN MEIT-W-1XR
(N = 304 for ELI-1B; 321 for ELI-2B)

MEIT-W-1XR Item Number	Source: ELI-1B Item Number	Source: ELI-2B Item Number	p value
41	16	3	.77[a]
42		7	.48
43	2	1	.83[a]
44	3		.57
45	7	5	.70[a]
46	10		.68
47	5	6	.85[a]
48	8		.50
49		2	.70
50		8	.57
51		4	.60
52	11		.43
53		13	.47
54	6	10	.72[a]
55		15	.60

[a]Mean p value for ELI-1B and -2B samples. Items are common to the two forms.

APPENDIX A-3

STATISTICAL DATA FOR VERBAL ELECTRICAL INFORMATION ITEMS
IN MEIT-W-1XR
(N = 350 for MEIT-W; 321 for ELI-2B)

MEIT-W-1XR Item Number	Source		p value	r_{ic}	r_{it}
	MEIT-W Item Number	ELI-2B Item Number			
56	72		.43	.30	.51
57	53		.84	.25	.48
58	52		.72	.21	.29
59	63		.75	.37	.58
60	55		.50	.24	.43
61	67		.55	.29	.46
62	88		.60	.32	.41
63	57		.66	.19	.29
64	64		.76	.24	.54
65	79		.44	.36	.48
66	65		.56	.19	.50
67	83		.50	.21	.38
68	78		.41	.18	.39
69	54		.64	.22	.38
70		23	.67		
71	87		.77	.30	.63
72	56		.54	.22	.50
73	51		.82	.26	.37
74	59		.77	.27	.50
75	71		.45	.38	.53